WASHINGTON STATE DEPARTMENT OF ECOLOGY

November 19, 2003
(Updated May 2006)

GENERAL USE LEVEL DESIGNATION FOR PRETREATMENT (TSS)

For

CONTECH Stormwater Solutions Inc. Vortechs® System

Ecology's Decision:

Based on the CONTECH Stormwater Solutions Inc. (CONTECH) application submissions for the Vortechs System® and recommendations by the Technical Review Committee (TRC), Ecology hereby issues the following use designations for the Vortechs technology:

1. **General Use Level Designation (GULD) for pretreatment use, as defined in the Ecology Manual Volume I, (a) ahead of infiltration treatment, or (b) to protect and extend the maintenance cycle of a Basic or Enhanced Treatment device (e.g., sand or media filter). This GULD applies to Vortechs units sized at an operating rate of no more than 35 gpm/sf of grit chamber area at the Water Quality design flow rate as determined using the Western Washington Hydrology Model (WWHM). The following table shows flow rates associated with various grit chamber sizes:**

Washington State Vortechs System Sizing		
Vortechs System	**Grit Chamber Diameter**	**35 gpm/ft2 Flow Rate**
Model ID	**ft**	**cfs**
1000	**3**	**0.55**
2000	**4**	**1.0**
3000	**5**	**1.5**
4000	**6**	**2.2**
5000	**7**	**3.0**
7000	**8**	**3.9**
9000	**9**	**5.0**
11000	**10**	**6.1**
16000	**12**	**8.8**

2. **Properly designed and operated Vortechs systems may also have applicability in other situations (example: low-head situations such as bridges or ferry docks), for TSS and oil/grease removal where, on a case-by-case basis, it is found to be infeasible or impracticable to use any other approved practice. Local jurisdictions should follow established variance or exception procedures in approving such applications.**

3. **Ecology finds that the Vortechs, sized at an operating rate of 35 GPM/sf, could also provide:**
    - **Water quality benefits in retrofit situations.**
    - **The first component in a treatment train.**
    - **Effective removal of deicing grit/sand.**
    - **Applicable for low head situations and/or utility conflicts where it is found to be infeasible or impractical to use any other approved practice.**

Ecology's Conditions of Use:

1. **Vortechs Systems must be designed, assembled, installed, operated, and maintained in accordance with applicable CONTECH *Product Design Manual Version 4.1 (April 2006)* or most current versions, and the Ecology Decision.**

2. **Discharges from the Vortechs System shall not cause or contribute to water quality standards violations in receiving waters.**

Applicant: CONTECH Stormwater Solutions Inc., Manufacturer and Vendor

Applicant's Address: 12021B NE Airport Way
Portland, OR 97220

Application Documents:

- Vortechs System Conditional Use Approval Application Letter to the Washington State Department of Ecology (June 25, 2003)

- Vortechs Stormwater Treatment System Technology Report, June 2003 Technical Appendices 1 through 16

Applicant's Use Level Request:

Conditional Use Designation as a Basic Treatment device in accordance with Ecology's 2001 stormwater manual.

Applicant's Performance Claims:

Based on laboratory trials, the Vortechs System will achieve an 80% TSS removal efficiency for sediment particles ranging from 38 to 75 microns at an operating rate of 13 gallons per minute per square foot (GPM/sf) at the peak flow for the Ecology design treatment storm.

The system is recommended only for sites likely to produce relatively high TSS concentrations (above 100 mg/L), where TSS is primarily composed of 50 microns and larger. Potentially appropriate sites include parking lots, highways and urban streets, material transfer sites, hydrocarbon transfer sites, retrofits, steep/erosive sites, and space-limited sites.

Technical Review Committee's Recommendation:

The TRC finds that:

- The Vortechs system, sized at 35 GPM/sf, should provide, at a minimum, equivalent performance to a presettling basin as defined in the most recent *Stormwater Management Manual for Western Washington), Volume V, Chapter 6*.

Findings of Fact:

1. Laboratory testing was completed by CONTECH for sieved sand using a Vortechs Model 2000. Laboratory results for the "50 micron" particle range (included particles ranging from 38 to 75 microns) showed 80% removal at 13 GPM/sf operating rate.
2. Abbreviated laboratory testing was completed by CONTECH for Sil-Co-Sil 106, a ground silica product with a mean particle size of about 20 microns. Removal rates at 5 to 10 GPM/sf were around 40%.
3. Various field studies were completed by independent parties in the eastern and northeastern United States (Lake George, NY; South Windsor, CT; Yarmouth, ME; Harding Township, NJ; Lexington, MA; Burlington, VT; and Charlottesville, VA). Study details are provided in the technical appendices. These studies generally show above 80% TSS removal rates. However, the results from a particle size distribution analysis on sediment captured in the Lake George Vortechs System indicate that mainly coarse particles were present. Because the influent particle size distribution was not measured removal efficiency of specific particle sizes could not be determined.
4. Three field studies were completed by independent parties in the Pacific Northwest (WSDOT SR-405; Buffalo Slough/City of Portland; Unified Sewerage Agency, Oregon). Study details were not included in CONTECH submissions. These studies generally show TSS removal rates to support a 40% pretreatment rating by Ecology for systems in the PNW, where soils range from a silt to silt loam.
5. The system is easily maintained using a vacuum truck.
6. There are over 4,400 and 100 Vortechs systems installed nationwide and in the Pacific Northwest, respectively.

Technology Description:

CD-ROM of Vortechs System Technology Report, dated June 2003, may be requested from CONTECH Stormwater Solutions Inc.

Design Manual and technical bulletins can be downloaded from company's web site.

Contact Information:

Applicant Contact:	Sean Darcy (800) 548-4667 darcys@contech-cpi.com
Applicant website:	www.contechstormwater.com
Ecology web link:	http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html
Ecology:	Mieke Hoppin Water Quality Program (360) 407-6435 mhop461@ecy.wa.gov
TRC:	Dave Tucker, P.E. Kitsap County (360) 337-7292 dtucker@co.kitsap.wa.us